

정상성인에서 방사선동위원소 추적자를 이용하여 측정된 고장성 식염수(Hypertonic Saline)가 비강의 점액섬모청소능(Mucociliary Clearance)에 미치는 영향

박성국 · 김태섭 · 엄재욱 · 박춘근

Effects of Hypertonic Saline on Nasal Mucociliary Clearance in Normal Adults Using Radioisotope Tracer

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— ABSTRACT —

Background and Objectives : Nasal irrigation has been used usually in the treatment of patients with acute and chronic sinusitis and has also been utilized in the postoperative care of functional endoscopic sinus surgery patients. Nasal irrigation aids in the clearance of secretion, infective debris and intranasal crust which may lead to adhesion. Solutions used for nasal irrigation should not allow any impairment on the mucociliary system which contributes to the defense mechanism of the respiratory tract. For many decades, rhinologists have used normal saline as an ideal solution for mucociliary system. Recently, there are some reports that nasal irrigation with hypertonic (3%) saline is more effective on sinusitis and postoperative care of sinus surgery than irrigation with normal saline. But those were based on data using saccharine, which is a soluble tracer. And there is no report using insoluble tracer which reflects transport ability of gel layer of the mucous blanket. Therefore we performed this test in order to evaluate the effect of hypertonic saline on nasal mucociliary clearance in normal adults. **Materials and Method** : We studied 20 normal adults who did not have nasal diseases, aged from 17 to 24 years old, using human albumin tagged with radioisotope (Tc 99m). Nasal flow test was done with Glatzel mirror and open side was chosen. Control measurement was done before spray of normal saline and hypertonic (3%) saline. Also, the effects of normal saline and hypertonic saline on mucociliary clearance were measured after spray. **Results** : After spray of normal saline, mucociliary clearance increased to 4.96 ± 2.33 mm/min, whereas in the control group was 4.60 ± 1.85 mm/min. However, there were no statistical differences between the normal saline group and the control group ($p=0.5288$). But mucociliary clearance of hypertonic saline group increased to 5.96 ± 2.50 mm/min, whereas in the control group was 4.92 ± 2.34 mm/min and there were significant differences between hypertonic saline group and the control group ($p=0.0142$). **Conclusion** : The results of this study suggest that hypertonic (3%) saline irrigation has the

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effect of improving nasal mucociliary clearance. Also the results suggest that hypertonic saline affects the gel layer. Further rheologic studies should be made in order to know the mechanism of effect of hypertonic saline on mucociliary clearance. (**J Clinical Otolaryngol 1999;10:61-65**)

KEY WORDS : Nasal mucociliary clearance · Hypertonic saline · Radioisotope.

서 론

1.5 cm

20
(Digital Ca -
mera G CA - 601 - E, Toshiba, Tokyo, Japan)

5

(0.9%,

128 x 128 matrix

1 2

(3%)가

5 cm

가 가 (saccharin) 가 10

3 cc 가

가 .¹⁾ 가 10

가 15

1

1 (3%)

17 24 (

21) 20 4 rad 0.7 rad

2 cm Glatzel

SAS univariate procedure

paired T - test

결 과

(human albumin tagged Tc99m Techne albu -
min kit, Daiichi Radioisotope Laboratory, Japan)

4 cm 25G 1 cc

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Table 1. Results after treatment with normal saline

Subject	Control (mm/min)	After NST* (mm/min)	Change (mm/min)
1	1.6	5.6	+4.0
2	4.0	4.0	0
3	2.4	6.4	+4.0
4	6.4	1.6	-4.8
5	2.4	2.4	0
6	4.8	4.0	-0.8
7	3.2	3.2	0
8	3.2	4.0	+0.8
9	8.0	3.2	-4.8
10	5.6	6.4	+0.8
11	4.0	3.2	-0.8
12	4.8	5.6	+0.8
13	5.6	6.4	+0.8
14	5.6	5.6	0
15	6.4	7.2	+0.8
16	7.2	4.8	-2.4
17	2.4	2.4	0
18	5.6	10.4	+4.8
19	6.4	9.6	+3.2
20	2.4	3.2	+0.8
Mean	4.60 ± 1.85	4.96 ± 2.33	0.36 ± 2.51

*NST : Normal saline treatment

Table 2. Results after treatment with Hypertonic saline

Subject	Control (mm/min)	After NST* (mm/min)	Change (mm/min)
1	3.2	6.4	+3.2
2	3.2	4.0	+0.8
3	2.4	2.4	0
4	8.0	8.0	0
5	5.6	9.6	+4.0
6	7.2	6.4	-0.8
7	4.0	6.4	+2.4
8	4.0	7.2	+3.2
9	2.4	2.4	0
10	4.0	2.4	-1.6
11	2.4	2.4	0
12	6.4	8.8	+2.4
13	4.8	6.4	+1.6
14	4.0	7.2	+3.2
15	5.6	8.8	+3.2
16	6.4	4.8	-1.6
17	4.0	4.8	+0.8
18	9.6	10.4	+0.8
19	9.6	6.4	-3.2
20	1.6	4.0	+2.4
Mean	4.92 ± 2.34	5.96 ± 2.50	1.20 ± 1.96

*HTST : Hypertonic saline treatment

Table 1, 2

가 4. 96 ± 2.33 mm/min 가 4.60 ± 1.85 mm/min 가 (p=0.5288) 5.96 ± 2.50 mm/min 가 4.92 ± 2.34 mm/min 가 (p=0.0142). 고 찰

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